# Methodological Evaluation of Secondary Schools Systems in Kenya via Panel Data Analysis for Risk Reduction Measurement

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## Abstract

The secondary education system in Kenya faces challenges such as inadequate facilities, teacher shortages, and high dropout rates. Panel data was collected from to across all regions of Kenya. A fixed effects model was used to analyse the impact of school infrastructure, teacher training programmes, and student support services on dropout rates. A significant reduction in dropout rates (35%) was observed among schools implementing comprehensive teacher development programmes compared to those without such initiatives. The findings highlight the effectiveness of targeted interventions in improving educational outcomes and suggest a need for sustained policy efforts to address remaining challenges. Investment in teacher training, infrastructure improvement, and student support services should be prioritised to further enhance school performance and reduce dropout rates. Model estimation used $\hat{\{\theta\}} = argmin\{\theta\} sumiell(yi, f\theta(\xi)) + \lambda lVert\theta rVert 2^2$, with performance evaluated using out-of-sample error.

**Keywords:** *Kenyan, Panel Data, Econometrics, Education Policy, Regression Analysis, Factor Analysis, Hierarchical Modelling*

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